

ADDENDUM

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1976



1891

DISCUSSION OF METHODS TO SOLVE A SUDDENLY TURNED UP SHORTAGE IN HOUSING

Housing shortage

The conception of housing-shortage is policy-facted. It can be defined as the difference between supply and demand in general at a certain time. Simplified it might be expressed as the need of housing for a group of people with their wishes or needs ranging from no accomodation at all at one extreme and people looking for housing of higher quiality or more attractively located housing at the other extreme.

The lack of housing may thus be measured by certain nationally fixed requirements in quality in a total housingstock. Here we include a great number of lodgings that are not registred in any housing-queue. Many people accept an inferiour lodging and/or less well located housing. The conclusion of this is that a situation with non-occupied apartments in a country does not implicate that there is no lack of housing.

The lack of housing mentioned is definitely of long-range nature and the problems connected are to be solved by long-range policy measures, i.e. long-range housing-policy proceedings in a country.

But there is also a housing-shortage of a different kind, a shortage that arises acutely caused by a catastrophe that affects a housing-area, through which a number of people suddenly become homeless. Certainly these catastrophes have always existed, but through our rather new and extremely speedy means of visual communications, our awareness of them has certainly radically changed. This is no doubt to a great dela due to the fact that we take part of the films and reports from these places in the same moment, more or less, as they are subject to these catastrophies.

The formulation of the problems

This dessertation analyses the problems connected with solving such an acute housing-shortage. I will also show in detail such a suddenly turned up shortage in housing as a case-study - reconstruction of houses in war-affected areas in Vietnam.

Simplified the problems are as follows:

- how to approach to give housing to a great number of suddenly homeless people. But the problem is even more far-reaching
- how should this be carried out and synchronized so that fundamental requirements in a long-term point of view can be fulfilled

We thus have a connection between the solution of the acute housing-shortage and the long-term solutions (integration). The dissertation treats two more factors which gives the problem a dimension of it's own.

- how is the mentioned reconstruction carried out in a so called semi-industrialized country, which is lacking necessary resources for a rapid reconstruction, and consequently dependent on distributions from abroad
- how could such an assistance-action contribute to technical improvements in the local building-industry.

The framing of the problem is in the long-range planning connected with the discussions, which were carried out in June 1976 at the UN conference on housing, Habitat, in Vancouver. It is here limited to the rather specific demand for housing, which is actualized by catastrophe on any kind.

In the technical part of this disertation the problems and solutions for the reconstruction of Vietnam have been tretated in detail. Emanating from a comparison with other stated case-studies some general conclusions have been drawn and a tentative strategy has been presented. (p. 47). Here I should like to add more in detail the basis for this comparison on methods used hitherto to solve acute housing-shortage in the world.

Different methods used for solving the problem

Concerning compiled and systematized existing information and suggested policy guidelines related to the use of local building materials and appropriate construction methods (especially labour intensive practises) in the construction of low-cost housing and related infrastructure facilities, there is a list of reference at the end of the dissertation. Several of these publications were used for the elaboration of the Vietnam-conception and technical memorandum.

In the following I will give a summary of contents for some of the basic background documents in a way that indicates approaches and documental failures in different cases. In the choice of these documents of reference, the following have been emphasized; current importance consideration and updating of previous acquired experience. It goes without saying that all documents of relevancy have not been possible to find.

The search for ideas for a new conception and suggested methods are in principle based on the following publications:

- Davis, I: Emergency shelter
Howard, J: Disaster shelter
Murlins, J: Disaster shelter and rehousing
Turner, J: Freedom to build (for more general conclusions)
Krimgold, F: The role of international aid for predisaster planning in developing countries

Considerations about procedures with general application

In the context of disaster-assistance in general the following

stated view seem to have a great significance.

Krimgold

All aid of industrialized countries to non-industrialized countries will reflect the differences between the two parts of the world. The conflict of values is summarized as follows:

Industrialized society

- 1 large energy input
- 2 one way use of material and energy sources
- 3 mass production
- 4 high specialization
- 5 city emphasis
- 6 capital intensive
- 7 general efficiency increases with size

Non-industrialized society

- 1 small energy input
- 2 reversible materials and renewable energy sources only
- 3 craft industry
- low specialization
- 5 village emphasis
- 6 labour intensive
- 7 general efficiency decreases with size

Howard

Howard underlines the basic needs of human beings in disaster conditions: "It seems necessary to to this as sometimes the uniformed or cynical question the necessity of providing shelter at all."

"Human beings require some shelter protection from the weather under all conditions, it enables families to

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re-establish life together, it provides privacy and a place to sleep. Protected sleeping areas are of fundamental importance. Finally people should be assisted to return to their usual life pattern as soon as possible.

Murlins

Murlins rises the question if it is not unreasonable to ask whether re-housing, as opposed to initial shelter, should be provided at all by outside agencies, even - or particularly - on a temporary basis. "There is a strong evidence to suggest that after a sudden catastrophe, people retain a surprising ability to help themselves. Whilst there is equally strong evidence that a period of confusion amongst certain people occurs, which prevents them from helping themselves initially. This lasts for a few days at the most.

Unfortunately, there is a shortage of information about the speed of local rebuilding, and considerably more effort should be applied to find out how long it takes for people to repair or reconstruct their houses after a disaster. There is of course, a special problem for a community to undertake reconstruction without considerable aid where building methods are heavy and/or scarce materials are used. In certain cases, analogue materials can be supplied. Alternatives to some time-consuming details can be provided."

Turner

Turner admits in his general housing policy that "Where survival is at stake, we have to accept conditions, which would otherwise be intolerable. Victims of disaster, for example, are indeed dependent on shelter provided for them." This as a complementary remark to his general housing policy. where he makes an all-important distinction between the local, small-scale problems of using available resources and the large-scale social and economic problems of the availability of those resources.

Turner also underlines that a housing project is a complete system or set of components, commonly consisting of a series of communications and utility networks, a series of public, semi-public and private spaces and, of course, a series of structures including shops, schools and so forth, as well as houses.

Report of case-studies in the past

Davis

Davis has described the reconstruction after a natural catastrophe in seven cases. In a synopsis he has systematized the different approaches and principals that have been used in these seven cases. The synthesis of this work is shown in the following two tables:

Disaster	Type of Shelter	Date of First Occupancy
SKOPJE	Quonset huts	50+ days
	Nissen huts	80 days
	Dexion houses (War on Want)	115 days
GEDIZ	Igloos (German Red Cross)	6 days (all unit 60 days)
CHIMBOTE	Wooden houses (AID)	60 days
	Igloos	60 days
MANAGUA	Wooden houses (AID)	60 days
	Igloos (German Red Cross)	60 days
FIFI	Wooden houses (Care)	60 days
LICE	Igloos (Oxfam)	60 days

Disaster	Approx No. of houses destroyed or very badly damaged	Approx No. of shelter units	Approx No. made homeless	Approx No. catered for in shelters	% use of shelter provision	Evacuation policy	% of homeless in shelter provision by donors
SKOPJE	50,000	5,000 tents from which people moved into 1711 shelter units	100,000	10,266 Balance staying with relatives etc until perm. housing was ready	60% for tents. 100% for housing	Yes	10.26%
GEDIZ	14,000	Approx 87,000 in tents. 400 in igloos	90,000	15-20,000 in tents and 1,600 in igloos	100% but igloos used for animals and storage	No (Although Gediz was relocated)	Uncertain
CHIMBOTE	100,000	Approx 20,000 tents. 1,298 shelters	500,000	Approx 80,000 in tents and 7,780 in shelters. Balance in extended families or private rebuilding	50-60% AID 30% UN 100% igloos	NO	17.55%
BANGLADESH Phasw 2 Immediate Post-war June 1972- June 1973	1.56 million	445,522 (permanent houses)	11 million	approx 2895,893	100%	No	26.06% The balance building their own houses
MANAGUA	50,000	Approx 2,000 tents from which people moved into 14,000 shelter units	250,000	84,000	Tents approx 50% AID houses 35% Igloos (Masaya) 24%	Yes	6.66%
FIFI	15,000	Approx 1,000 tents 601 houses	80,000	3,606	Unknown	No	
LICE	15,000	5,000 tents 439	2,500 families	27,000	Unknown	No	

The conclusions drawn by Davis from these cases are:

- The percentage of the homeless in shelters provided by donors is relatively low, particularly so in Managua, but higher in rural areas.
- Because of underuse in such places as Managua and Chimbote, it cannot be assumed that this is a direct reflection of need. Further evidence in both places indicate considerable public dislike of shelter provision.
- The question of the adequacy of shelter provision is clouded by the housing question, since in all the cases of this chart, permanent housing was being built at the same time as shelters were being provided.

Guiding principles for the Vietnam-conception

Some of the guiding principles for the Vietnam-projects appear from the following extracts from my dissertation:

- The rather long time used for the preplanning, a little more than one month, admitted a week's visit on the spot by the expert-group. During the visit the basis for the housing-conception were elaborated and based on existing Vietnamese plans for townplanning, supply of materials, available local transport etc.
- As shown in the dissertation, the plan of the house itself, as it is presented in the technical memo to future suppliers, was a direct copy of existing Vietnamese drawings.
- The task of planning, coordination, use of existing resources etc was confined to one institution on each side, i.e. the Ministry of Construction in Hanoi and the IOG in Geneva, with the sole and full responsibility of carrying out the operation.
- As no donated funds were ever ear-

marked for any special housetype, there was no donor influence. The choice of houses followed the free market laws.

- The choice of distribution of funds between infrastructure material, cranes and houses was done by the responsible Vietnamese experts, with the exception of the first dispatch of galvanized coldwater steeltubes. The explanation to this is given in the dissertation.
- Drawings for the different house-types as well as the choice of materials, colours etc were submitted to the decision of the Vietnamese authorities. Later on recurrent meetings between experts from the Ministry of Construction and the Housing-coordinator enabled some changes even after having started the production.
- The main house-types were constructed as prototypes, which were subject to several major changes before starting the production.
- Coordination of seatransport with the harbour authorities of Haiphong.

Differences between the Vietnam-conception and other cases

Due to reasons described and discussed in this Addendum, each case is to a large extent unique. Furthermore the cases in literature are documented in various ways and with varying wealth of details. This fact excludes a comparative analysis out of which a general conclusion might be drawn. With the base-material available for the time being, only a very general and comparative discussion can be presented. I hope this might inspire to a better organized documentation for these cases in future and indicate what factors that in this context need special attentions.

One of the main features separating the Vietnam-conception from other cases is the very high level of education and administrative routine of the Vietnamese people involved in this operation.

Thus many of the failures in international aid projects have, to a large extent

been avoided by making the project an integrated part of the overall reconstruction of Vietnam. As the Vietnam-conception has evolved taking into consideration the results of preceeding models, at least to a large extent known, it might be suitable for it's purpose to concentrate the comparison with other operations and guiding policies to those parts where the Vietnam-conception differs.

PROCEDURES OF SCANNING RELEVANT SOLUTIONS.

In the following two examples of approaching the problems are presented.

Comparative consideration between different types of shelters

One of the most important decisions to be taken was the "level of pre-fabrication" for the shelters. In the following a survey and analysis of these considerations will be presented starting from the immediate assistance in form of tents and continuing to the sophisticated industrially prefabricated house.

Tents

The general reasons for using tents have been summarized by Jurg Vittani, director, Relief Suppliers Bureau, League of Red Cross Societies.

Reasonable durability: Provisional shelter should not be too resistant. In other words, have a certain degree of "self destruction" after use during 6-8 months. Example: Igloos in Peru still used 4 years after earthquake have developed into "Shanty town".

Low cost: Tents at present mostly used as emergency shelter cost between S.Fr 200-300 per family unit. Any new type of shelter should therefore in order to be competitive not cost more than a family tent.

Water proof: Adequate resistance

against wind and rain.

Easily erectable: Foolproof shelter erectable by untrained local people without foreign specialized manpower and without sophisticated technical requirements.

Easily transportable: A) Weight: Family tents now approximately 20 kgs per unit (polyethylene), approximately 40 kgs in canvas. One unit possible to be carried by one person. B) Dimensions: Transportable in normal truck or small airplane. C) Possibility of air-dropping.

Howard remains rather critical of the use of tents. They are not cheap at around £100 each. There are never enough when large numbers are required; probably 500 is the maximum obtainable at any one time.

They are very bulky for air transport and can cost as much to transport as is their original cost. The shelf life is very limited, probably 5-7 years, and a good dry storage is needed. Agencies are not willing to stockpile large numbers of tents for various reasons, not least because of the tying up of large amounts of capital.

Tents have a limited life in field. They have little value during the rehabilitation period following a disaster. They are unsuitable for cold windy conditions and they do catch fire. Howard stresses the definite policy of using local materials and labour to produce emergency housing wherever possible. However, this is easier said than done. There is a tremendous need for research and development for making on-site shelter.

In the IOG emergency housing operation the idea of providing tents at any phase of the accomplishment was abandoned at a very early stage of the discussions with the Vietnamese authorities. The reasons were identical with those stated by Messrs Davis, Krimgold and Howard.

- The existance of an extended-family-pattern. (Davis) As mentioned in my dissertation, public buildings and pagodas were used to house people from destroyed areas. As this has al-

ready lasted for years it also diminished the stress on the time-factor.

- The high cost of each tent and limitation in number. (Howard) A very rough estimation showed that the pure cost would at least be five times higher per square meter during the period of use. In this comparison all other qualities have been left apart.
- One way of use of material. (Krimgold) The tents would not have been possible to alter into permanent housing, which was one of the main purposes of the IOG operation.
- Tents have little value during the rehabilitation period following a disaster. (Howard) The intention for the final result was not only to arrive at a certain number of dwellings but to encourage and engage Vietnamese people during the operation.

"Instant shelters"

Another interesting and most important problem was the "degree of pre-fabrication" to be aimed at. The fully prefabricated housing units might be divided in so called "instant shelters" and "traditional prefabricated houses". Among these "instant shelters" one could mention the Bayer urethan foam coupol, the Oxfam hexagonal unit and the Onduline vault-shelter.

These were abandoned in further planning due to existing field experience. The igloos have been used in Gediz (Turkey), Chimbote (Peru) and Managua (Nicaragua). The Oxfam units in Bangladesh and Iice (Turkey) and the Onduline houses in various places as single units.

In the Vietnam-conception the main reasons for the non-acceptance were:

"To recognize the need for shelter provision to be totally diverse to suit local patterns local materials and local climate" (Davis). People used to corner-shaped indoor-space will have great difficulties to accept a spheric or vaulted limitation of their room, due to existing traditions for furnishing and storage of food and property.

In the technical part of the dissertation questions as acceptable indoor-climate depending on crossventilation, landexploitation, possible enlargements and changes in the future etc are thoroughly treated. Here it is sufficient to note that these "instant shelters" do not fulfil these requirements.

The importance of the timelag after a disaster for the basic needs has been shown by Krimgold in a graph (p. 9). Davis also notes that the overriding impression from an examination of donor provision is the extensive time required to arrive and be installed in most cases 2-5 months.

The general conclusion as concerns the timelag in using "instant shelters" versus other more adapted housing is that "instant shelters" have little influence on the gain of time. It is generally recognized that reconstruction methods in developing countries have to be labour intensive, but as Turner notes the process should be toward partial industrialization. "The primary basis here is that certain "degrees" or "types" of industrialization, which for our purposes can be labelled "partially industrialized technologies" can be immediately appropriate and useful, even in the economies of scarcity in developing areas. This holds true both from the viewpoint of cost and from the viewpoint of autonomy and freedom of action."

None of the known "instant shelters" are either labourintensive or contributory to any type of industrialization in developing countries.

This should of course in an emergency situation be considered against Howard's point of view concerning why the Oxfam unit has been used: "Our intention has been to find a way to make an on-site shelter and this we have done and quite successfully. The shelters we have made have been water-tight, warm and comfortable and much sought-after by the local people. We are fully aware of the drawbacks of using sophisticated manufacturing items such as spray guns; we are aware of the risks with the polyurethane materials, particularly with the fire risks. However, the Turkish government is enthused by the technology and is itself taking up the system. The point that this particular development has proved to us beyond any doubt is not that polyurethane is good or bad, but that an on-site technique of building shelter or housing is of major importance today".

Traditionally prefabricated houses

The consideration here has been developed in my dissertation (Contacts avec des fabricants et offres à considérer).

In general industrially prefabricated houses are made for a local (country) climate, social and cultural habits, landuse, living standard etc, also implicating a very high price. It is very difficult to imagine how all these factors could be taken into consideration when "adapting" an existing housetype to the conditions in another and different part of the world.

Still they have been used in most disasters. Krimgold gives the following explanation. "The industrialized countries of the world are, generally, enjoying their high standard of living at the cost of the non-industrialized countries. The price of non-industrial products is lower as related to labour input than the price of industrial products. For this reason we hesitate

to give away what we can sell. This also means that the type of material sent to disasters as relief very often is not determined by the real need of the disaster victims but instead by what happens to be surplus within the donor country. That is, we give away what we can't sell. There is very rarely any follow-up or evaluation of the usefulness of relief materials on the areas where they are meant to be applied. Often such "gifts" prove to be a greater burden than benefit in the long run."

Another consideration is the education of the public. Davis: "Obviously novel shaped buildings attract much-needed media coverage, but this can seriously mislead the public as to the real needs of the situation. Also the prices of western shelters are often quoted in figures well under actual cost once transport and development costs are added. Therefore, there is a need to spell out the problem to the public, and not to perpetuate myths."

These considerations about "the degree of prefabrication" formed the basis for the IOG choice of a system that should give a first protection to the inhabitants. The structure and roofing should be longlasting (30 years). The ventilation system should give a suitable indoor-climate. The house should be able to improve upon and to enlarge as soon as the general conditions in Vietnam permitted this. The Vietnam-conception is developed in my dissertation (p. 17, 24), where also the diverging approach to the public and the funding is developed.

Transport considerations

The cost for transport very soon becomes decisive. In the case of the earthquake in Lice this cost in one case represented one third of the total calculated cost per unit (4000US\$).

One of the basic ideas behind the polyurethane-designs is the very low cost, as the two "raw-materials" are transported granulated respectively as a fluid. The mixture on-site gives the foam necessary for the spray-process.

As concerns fully prefabricated houses, with wall insulation, glazed windows etc, it is evident that transport cost due to the big volume must be high. But in this case also the risk for damages rapidly increases through reloading operations. Such a case-study is treated in the dissertation (p. 102, 115), where the effects were disastrous, not to mention the bad use of scarce resources. In the Vietnam-conception the transport costs as an average were below 20 % of the total cost. The limitation of weight and size of the single packages also limited the damage of inland transportation to be quite negligible.

The contradictory conditions in planning transport in general as well as the experiences and conclusions drawn from this operation are treated in my dissertation (p. 92, 38, 43, 45).

INTERFERENCE BETWEEN ORGANISATIONAL PROBLEMS AND TECHNICAL SOLUTIONS.

When planning an assistance-operation within scarce resources and under a very heavy social pressure from people in need, it could be wise to try to list the different problems connected herewith. In this way, perhaps problems of pure emotional character could be kept back in order to favour solution-oriented decisions.

It is evident that almost any problem could be reflected in another problem, with quite contradictory demands to solve it. A first attempt for an operational analysis could be to list the questions in organisational problems and technical solutions.

Organisational problems

As mentioned on p. 17 in the dissertation, the speed

of carrying out the operation had to be decided against the following conditions:

- the urgent need of the population and the need for IOG to prove prompt results.
- the necessary time needed for the Vietnamese authorities to integrate the education, planning and practical works in the overall national development plan.
- the time needed for on-site preparations, infrastructure work, transport etc.

On the other side there existed a great number of changing conditions (p. 19) on a world-level and consequently outside the control of the two parties involved.

- tendencies in the development of prices in basic and raw-materials (for example, the price of zinc more than tripled in one year)
- tendencies in the transport situations with increasing oilprices.

Here two more aspects of great impact should be added

- the necessity to have a prompt market experience to enable a modification of future criteria for purchase
- a first quick order, even at a higher price, would stimulate further fundising, this justifying a limited and temporary sacrifice.

The rythme chosen when carrying out the operation had to be a compromise between these factors. The question was to find a balance between the interference with the total efforts laid down to reconstruct the country and the possible gains with a fast IOG-operation, which also was easier to express in monetary values.

Technical solutions

The technical solutions are worked out in terms of performance (p. 117) and the significance of these terms will be treated in next chapter. Here, some of the contradictory demands will be pointed out (p. 27)

- low cost. The price calculated early 1973 was 2000 SFR, transport not included. In this price, of course, the necessary complementary works which had to be carried out by the Vietnamese were not included.
- prompt delivery. No prefabricated houses adapted for the climate did exist at this cost
- durability. The houses ordered should give an immediate protection of acceptable standard but also permit future improvements. They should last not less than 30 years
- easy to assemble and independent of the techno-social environment.

If the social environment and the infrastructure do not exist on the spot, any project with too elaborated and inter-dependent elements will diminish the total value of the assistance (p. 49).

It is also evident that complete solutions demand more resources than their elements in combination.

- adaption to transport. Small and handy packages increase costs, volume and risk for losses (p. 42).

- integration. For a social acceptance is imperative that the houses are integrated in the cultural patterns of the country.

I have tried to illustrate the operational considerations of the often contradictory requirements within the given framework and at different levels in the following graph.

Levels	Characteristic features	Possible DRVN influence	Possible IOG influence
world level	steadily increasing prices for rawmaterials abruptly increased prices for petroleum-products (oil - embargo) one existing regular transport-way to DRVN scarce charter opportunities	none	none
country level	a general willingness to assist DRVN backed by a strong home-opinion - international support - bilateral support	increase support via propaganda goods sent via R.C	increase support with DRVN information material
operational field level (DRVN)	needs for education, town-planning, reconstruction of infrastructure and buildings limitations in building materials and equipment scarce transport resources war-affected population	decision on best way of IOG support	none
IOG-level	support influenced by early results support influenced by propaganda (brochure, TV, radio, personal visits)		availability of information material
company-level	no adapted housing-system existed a great willingness to sell due to regression. limited know-how new ideas launched with adapted solutions order for prototype alternations approval and transport	influence on memo final acceptance	compiling existing information consultation

Conclusions

In the IOG-operation the new ideas from the hitherto launched assistance operations can be summarized as follows:

- integration of the operation in the countries' general planning for the reconstruction, despite loss of time. The considerations for this are well developed in the dissertation.
- sharing of responsibilities and concentration to very few persons to optimize the contributions from both parties with regard to town-planning, stage of industrialization and the connected available resources, means and capacities for transport, international as well as domestic
- continuously shared follow-up of responsibilities during the operation
- mutual evaluation of different steps of the project during the operation, taking into account differences in scientific and technical approach, planning and cost- and benefit-analysis.

A final evaluation of the operation can naturally not be done until the more long-range effects have been complied. This is in force for all cases, but it is also missing from the emergency assistance operations many years ago. A follow-up evaluation should be carried out. When that is done one must accept that the evaluation of the houses themselves and their acceptance and integration in the culture is certainly a task, which should be done by the people, the residents. What concerns the methodics for such an evaluation, outside assistance might prove to be of great value.

TRANSFER OF TECHNOLOGY IN TERMS OF PERFORMANCE

"A growing number of development experts and national policy-makers are beginning to question the wisdom of massive technology transfers from the industrialized countries to the developing nations. The large-scale capital-intensive technologies developed in Europe, North America or Japan may well be very efficient, but their introduction into poorer, less developed societies often raises more problems than it can solve. They are usually very costly relative to the income of the local populations, they require an educational and industrial infrastructure which takes decades to build up and their disruptive social consequences tend to be much more sudden than in their culture of origin. But perhaps most important of all, their introduction often inhibits the growth of the indigenous innovative capabilities which are necessary if "development" is to take place.

Nicolas Jéquir, OECD Development Centre, Paris.

Technical Memorandum

The Technical Memorandum was set up with the requirements in terms of performance, i.e. the requirements expressed in certain demands of quality. The basic plans of a Vietnamese house were handed over by the authorities and copied in the memo, but with no specific materials expressively demanded. In a traditional Vietnamese house the walls and partitions are made of bricks or dried clay and the roofing in form of a ricestraw-thatched roof supported by a bamboo-frame.

Furthermore, the interior space in the houses looked for should allow a very high flexibility (p. 25. 121). The result has also been most encouraging as the IOG-houses are used, houses functioning for lodging, as schools, nurseries, clinics, assembly-halls, police-

-stations, etc, this also within the same area of settlement. One of the main demands was that the houses should be able to improve in the future both what concerns space, i.e. two apartments forming into one, and materials (p. 28. 118). Finally it was stressed that suggested solutions should include a study of possible local production of elements in the future (p. 118).

In this context it seems to be fair to use the words software and hardware, in analogy with their use in the computer industry. Software would thus express things as knowledge, know-how, experience, education and organisational forms. Hardware would be in form of factories, machines, products or infrastructure.

Transfer of software

The most important transfer of innovations what concerns software in this project are:

- ventilation system of the roof
- roof-construction with rigid trusses.
- self-supporting frame-work

In the following souse of principal features for "transferred" and accepted innovative ideas will be explained.

Ventilation-system of the roof

The principles for ventilation fo the roof for the different IOG-house types are shown on p. 44. The idea with a separate ventilation of the "garret" and the living space is to prevent radiated heat from the roofing to penetrate into the living space. If it works well it will never be warmer inside a house than in the shadow.

The feeling of freshness in tropical climates is due to the air movement and the necessity of crossventilation has been long since recognized. The old traditional straw-thatched roof gave a good protection against penetration of sunradiation.

However, new species of riceplants introduced in the country with a higher yield of rice also give a much lower yield of straw, both in quantity and quality (shorter). Consequently straw-thatched roofs are much thinner to-day than they used to be in the traditional way of building and thus do not form a sufficient heat-insulation.

By introducing a ceiling made of local board (explained under hardware) and letting the hot air escape at the eaves and by openings at the galoles it is possible to obtain a ventilationsystem very similar to the conception used in teh IOG houses.

Roofconstruction with rigid trusses

The traditional straw-thatched roof on a bamboo-frame has a durability of 4 to 5 years. The very thin layers of straw available to-day (5-10 cm instead of 30-40 cm) do not last much longer than one year without continious improvements. Clay-tiles as roofing-material are of course much more longlasting, but if the supporting truss is not rigid and bends down, rain-water will penetrate between the tiles. The heat-penetration from sun-radiation will also be considerable.

The wooden roof-trusses introduced formed a rigid unit. This was obtained by using nail-plates. The rafters do consequently not move and such a rigid truss forms an excellent support for a tile-roofing.

The Ministry of Construction in Hanoi has expressed its intention to develop similar devices for connection of bamboo-raflers. Such a rigid bamboo-truss could easily carry the weight of the tiles without deformation and thus no waterpenetration. Different types of brick-stones and tiles are shown on picture 33, p. 69.

Self-supporting framework

The lightweight wall and partition elements used in some of the house-types are fastened to a self-suppor-

ting framework that also withstands the wind-strsses. The framework has been made rigid by fixing the columns in the foundation (picture 50-51, p. 143) and by a rigid joint with the roof-truss.

The traditional system of light-weight constructions is based on a side-stabilization by use of bamboo-poles (picture 8 p. 21 and picture 32, p. 69).

By introducing a rigid framework, these bamboo-poles being an obstruction are avoided and at the time the construction has become adapted to a low grade of prefabrication, i.e. the wall elements do not need to be produced as an integrated part of the house, but could be pitted in at any stage in the construction.

Transfer of hardware

Local board

In the IOG-houses the ceilings and partitions, and in some cases also the wall-elements were composed of light-weight boards (i.e. chipboard, mazonite, plywood). In some cases they were stabilized by a crossbeam.

The chipboard, which in one case also constituted the entire wall, was impregnated against rotting and termites.

As the production of termite-resistant chipboard is rather complicated with very expensive installations required, it is not realistic to imagine a country-wide production in a near future. Furthermore there is a shortage in rawmaterials for the processus.

The Vietnamese have to a great deal solved this question by local production of bamboo-board. They have achieved a similar quality by using plaited bamboo-sheets glued together under hydraulic pressure. The equipment used is very simple and demands no expensive installations or auxiliary

technical services. The sheets are placed by hand inbetween a press worked by a hydraulic pump.

The glue is water-resistant and as the bamboo-fibre is quite resistant against termites, the Vietnamese have obtained a bamboo-board with performance specifications very similar to our chipboard and at the same time producing an ecological material. (A minimum of preservation chemicals).

Experiences and comments drawn from the Vietnam-conception

Any experience what so ever drawn from a project like this has to be related to the socio-cultural environment. The degree of moral "mobilisation" of a people and the acceptance of sacrifices for straight forward goals without considering short-range needs, as opposed to a policy of satisfying immediate needs, are of great impact of the relevancy of a proper evaluation.

For different reasons these "steering-models" have varied with different societies and time. The danger of at model approved by a very disciplined society is that one only gets the planners' views of the needs. The obvious risk is the creation of a mecanism that is not ready to learn is adaptable.

The critics expressed by local site-engineers and the continious changes in the conception while carrying out the operation makes it reasonable to think that the Vietnamese experiences are based on a more general bases than only the planners' views.

As regards the short-term effects - and to solve the acute problem is a question of short-term - an analysis is made by the Vietnamese authorities:

"These prefabricated houses have met the post-war living conditions of the people.

The introduction of these prefabricated houses into Vietnam is quite in gear with the general housing-program in

Vietnam at present. In this post-war period there are two modes of construction: one is to build lasting multi-storey houses, which is the principal construction mode in the towns and cities, the other is to build temporary one-storey houses, mainly for those localities severely hit by the war and for the countryside.

The IOG prefabricated houses belong to the realm of the second mode and they are well adapted to the trend of development of the construction industries in Vietnam.

In Vietnam the manufacturing of wooden- and bamboo-elements is being industrialized and this industry has a prospect of development in a not too distant future. In this condition the erection of the IOG houses gives precious experiences for the future construction of Vietnamese prefabricated houses. This is the technical significance of the IOG housing project.

It is safe to say that the development of construction industry in Vietnam and the assistance of IOG met in due time."

CONCLUSIONS

Conclusions and comments

The conclusions to be drawn from the Vietnam-conception are according to my opinion:

The model has been well adapted in the following considerations:

- the operation has been an encouraging manifestation of international assistance in many parts of the war-affected country. This might turn out to be one of the most important benefits for a people devastated by war for 30 years.

This implicates, of course, the people's acceptance of the housing conception.

- the diminution of the importance of time in favour of an integrated planning down to a local level and with the full responsibility placed on the local authorities
- the absolute need of coordinating the resources on the so called donor side. This is imperative! One example of failure due to neglect of this fact is discussed in the dissertation
- the manifold use of the houses for different needs of the community, and with these needs or wishes expressed on the local level
- integration into future development of light-weight housing industry. (Stability and construction of rooftrusses, ventilationsystems and roof-constructions, light-weight partition and wall elements).
- the very positive cooperation with manufacturers, probably due to the tender-description based on performance qualities.

In the following respects the model has not answered to the wishes:

- there was no introduction of "new-materials", the materials used were common market products.

Even if the operation and coordination was good, it should be improved in the future. The Vietnamese authorities expressed the following wishes:

- "the Vietnamese side had the worry whether the designers of the houses would easily accept modifications. But realities point to the fact that a number of changes did not affect the producers."
- from practical experiences drawn from the program, the Vietnamese side holds that, if the self providing ability with regard to materials on

the spot had correctly been measured right in 1973 and if there had been more extended cooperation between the Vietnamese experts and the producers, through IOG-experts, then there could have been more economical and appropriate solutions on the basis of utilizing frame-structures and roofing-materials imported from abroad and all the materials for protecting walls provided by the Vietnamese side. Such a mixed structure composition would have lessened the volume of transport and would have enabled the utilization of materials for protecting walls (such as bricks etc), which are more suitable to climate conditions in Vietnam, thus increasing the durability of the houses. At the same time, this would have created conditions for a better harmony of the houses with the surroundings.

That is to say, the contributions of the Vietnamese side could have been of greater effect.

Strategy for the future

In my dissertation two principal tasks for the IOG-operation have been defined:

- to supply housing giving an acceptable protection
- to suggest new ideas for the developing of local ideas.

Assistance projects have generally had a high degree of deviation. This is to a great deal due to suppositions that occidental standards are adequate when dealing with "forecasting-validity" referred to quantitatively defined projects.

In developing countries the only relevant aspect on transfer of technology is that operations may not depend on other services or resources. The future improvement or enlargement of, in this

case, the constructed dwellings must not cause more difficulties than the same operations with traditional buildings. Neither can it be accepted that parts of existing structures have to be demolished in order to achieve these improvements. The success and social acceptance of any project is directly depending on the freedom for changes in the future. Such a future evaluation should be done by the people using the facilities, and it should not be done earlier than 3-5 years after the settlement.

The striking thing today is the lack of basic data from all stages of carried out assistance-operations, from planning, choice of systems, tenders (if any), transport to final on-site assembly or construction.

This also means that it is not possible today to define a more general strategy for disaster-assistance in future. We need much more data about the operations launched so far and their results. We have to go back to the damaged and reconstructed places and ask people how they consider their situation today. (Such a follow-up visit is planned for the IOG-project in about 1978).

By going back now to the other places mentioned in this Addendum, we should be able to isolate successful results and hopefully find at least some of the basic ideas behind these results.

For actions of this kind in the future it should be an imperative requirement and stated as a natural task for any disaster-assistance to document and release information and considerations, on which decisions are based.

In my dissertation I have developed some ideas about how this information could be compiled into defined "part-operations", i.e. an accomplishment where the collected background-information is started, the choice of action and the final decisions are reported and the carrying out as well as the results are evaluated.

With a set of this "part-operations" ("sous-opérations") listed it should be possible in the future to approach

any disaster by impulsing to parameters

- similarity with other disasters in the general lines as for example range and place
- relevant "part-operations" selected from previous disaster assistance.

These two "frames" could exclude many non-sensitive actions, and that is already a great gain, and hopefully also indicate at least some rational decisions, which could be undertaken immediately.

This way transfer of technology would hopefully be positive, that is to learn and use what is adequate for the country under its specific circumstances, it should not be the export of ideas steaming from the industrialized world with its own values and for its own sake. Transfer of technology or in a wider sense transfer of ideas might also mean "export" from the so called underdeveloped countries to the west world or simply improvement on a process.

"Such a range of shelter possibilities has yet to be formulated, but it will have to be, and this will arise from the field of experience." (J. Howard)

